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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/549,856	06/26/2006	Richard J Harrison	118989-05120057	4777
20583	7590	03/18/2009		
JONES DAY 222 EAST 41ST ST NEW YORK, NY 10017			EXAMINER CHOI, LING SIU	
			ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/549,856	Applicant(s) HARRISON ET AL.	
	Examiner Ling-Siu Choi	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09/23/2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 and 27-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 and 27-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>09/23/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is in response to the Preliminary Amendment filed 09/23/2005. Claims 26 and 30-32 were cancelled. Claims 1-25 and 27-29 are now pending.

Claim Objections

2. Claims 2-6, 10, 13-14, 22-25, and 27 are objected to because of the following informalities: (A) **Claim 2**, line 5, "C₁ toC₃₀" is suggested to be changed to -- C₁ to C₃₀ --; (B) **Claim 5**, line 4, "Hal-CHR³-CR⁴=CH₂" is suggested to be changed to --Hal-CHR³-CR⁴=CH₂ --; (C) **Claim 10**, lines 5-6, "C₁ toC₆" is suggested to be changed to -- C₁ to C₆ --; (D) **Claim 10**, line 6, "C₂ toC₆" is suggested to be changed to -- C₂ to C₆ --; (E) **Claim 13**, lines 5-6, "is methyl or, and desirably, hydrogen" is suggested to be changed to --is methyl or hydrogen; and (F) **Claim 22**, line 2, "ofa" is suggested to be changed to --of a--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 16, 20-21, and 27-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949).

Claim 16 recites the broad recitation "from 50 to 150°C", and the claim also recites "particularly 50 to 100°C" which is the narrower statement of the range/limitation.

Claim 20, lines 2-3; **Claim 27**, line 2, claim recites the broad recitation "includes a Lewis acid", and the claim also recites "particularly a metal containing Lewis Acid" which is the narrower statement of the range/limitation.

Claim 21, lines 2-6; **Claim 28**, lines 2-6, claim recites the broad recitation “magnesium salt”, and the claim also recites “particularly a magnesium halide” which is the narrower statement of the range/limitation; claim recites the broad recitation “a zinc salt”, and the claim also recites “particularly a zinc halide” which is the narrower statement of the range/limitation; claim recites the broad recitation “lanthanum acetate”, and the claim also recites “particularly as the heptahydrate” which is the narrower statement of the range/limitation; claim recites the broad recitation “ytterbium halide”, and the claim also recites “particularly ytterbium chloride, or ytterbium triflate” which is the narrower statement of the range/limitation;

Claim Analysis

5. Summary of Claim 1:

A method of polymerising ethylenically unsaturated monomers in which at least one ethylenically unsaturated monomer is polymerised using a catalyst system having	
	a manganese carbonyl radical initiator
	a halogen containing reactive substrate
	an allylic halogen substituted chain termination agent

Summary of Claim 22:

A catalyst system for polymerising ethylenically unsaturated monomers which is a combination of	
	a manganese carbonyl radical initiator
	a halogen containing reactive substrate

	an allylic halogen substituted chain termination agent
--	--

Summary of Claim 29:

A polymer or copolymer of one or more ethylenically unsaturated monomers having	
	a residue of a <u>reactive substrate</u> at one end of the (co)polymeric chain and
	a residue of a <u>chain terminating agent</u> at the other

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

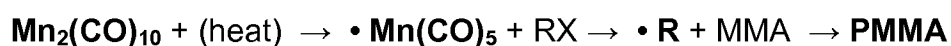
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Gilbert et al. [Macromolecules, 36, 9020-9023(2003)].

Gilbert et al. disclose a method to polymerize methyl methacrylate in the presence of dimanganese decacarbonyl [$\text{Mn}_2(\text{CO})_{10}$] and at least one organic halide in toluene at 60-90°C, wherein organic halide includes CCl_4 , $\text{C}_6\text{H}_5\text{CH}_2\text{Br}$, $\text{C}_6\text{H}_5\text{CH}_2\text{Cl}$, $\text{BrCH}_2\text{C}(\text{Br})=\text{CH}_2$, $\text{ClCH}_2\text{C}(\text{Cl})=\text{CH}_2$, and $\text{BrCH}_2\text{C}(\text{COOBU})=\text{CH}_2$ (abstract; Tables 1-2). Gilbert et al. further disclose that “The manganese pentacarbonyl radical ($\bullet\text{Mn}(\text{CO})_5$), generated by either thermolysis or photolysis of the relatively weak Mn-Mn

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bond, can abstract a halogen atom from a variety of organohalides (RX) bearing weak C-X bonds, forming carbon-centered radicals (R•)” and “It was envisaged that this could provide a mild and efficient approach to a variety of radicals that could initiate polymerization of MMA to form poly(methyl methacrylate) (PMMA) **bearing several different end groups**” (second column of page 9020).



Furthermore, Gilbert et al. exemplify the use of mixed organic halides for polymerizing MMA in the presence of $\text{Mn}_2(\text{CO})_{10}$, wherein the mixed organic halides are combinations of 2,3-dichloro- or 2,3-dibromo-propene; and CCl_4 (second column of page 9022; first column of page 9023). Thus, the present claims are anticipated by the disclosure of Gilbert et al.

8. Claims 22-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Gilbert et al. [Macromolecules, 36, 9020-9023(2003)].

Gilbert et al. disclose a catalyst to polymerize MMA, wherein the catalyst comprising $\text{Mn}_2(\text{CO})_{10}$ and a combinations of 2,3-dichloro-[or 2,3-dibromo-] propene and CCl_4 (second column of page 9022; first column of page 9023). Thus, the present claims are anticipated by the disclosure of Gilbert et al.

9. Claim 29 is rejected under 35 U.S.C. 102(b) as being anticipated by Gilbert et al. [Macromolecules, 36, 9020-9023(2003)].

Gilbert et al. disclose PMMA in the presence of a catalyst comprising $\text{Mn}_2(\text{CO})_{10}$ and a combinations of 2,3-dichloro-[or 2,3-dibromo-] propene and CCl_4 (second column of page 9022; first column of page 9023). Gilbert et al. further disclose that “It was envisaged that this could provide a mild and efficient approach to a variety of radicals that could initiate polymerization of MMA to form poly(methyl methacrylate) (PMMA) bearing several different end groups” (second column of page 9020). Thus, the present claims are anticipated by the disclosure of Gilbert et al.

Claim Rejections - 35 USC § 103

10. **The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:**

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11, Claims 20 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gilbert et al. [Macromolecules, 36, 9020-9023(2003)] in view of Lu (US 4,053,316).

The disclosure of Gilbert et al. is set adequately set forth in paragraphs 7 and 8 and is incorporated herein by reference.

The difference between the present claims and the disclosure of Gilbert et al. is the requirement of a specific Lewis acid to be used.

Lu discloses a method to photopolymerize ethylenically unsaturated organic compound in the presence of $Mn_2(CO)_{10}$ and a cocatalyst (abstract). Lu further discloses that polymerization inhibitor such as copper naphthenate is used to stabilize the photopolymerizable composition (col. 5, lines 12-23). In light of such benefit, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate such compound in the polymerization method or catalyst, thereby obtaining the present invention.

Allowable Subject Matter

12. Claims 21 and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Gilbert et al. [Macromolecules, 36, 9020-9023(2003)] do not teach or fairly suggest the claimed method to polymerize at least one ethylenically unsaturated monomer and claimed catalyst, wherein the specific metal-containing Lewis acid is used in the catalyst system.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ling-Siu Choi whose telephone number is 571-272-1098. The examiner can normally be reached on Monday to Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Ling-Siu Choi/

Primary Examiner, Art Unit 1796

March 10, 2009

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